



# TRANSIT NOISE AND VIBRATION IMPACT ASSESSMENT

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different modes of transit. Since the APTA Guidelines are expressed in terms of maximum passby noise, they are not sensitive to the frequency or duration of noise events for transit modes other than conventional rail rapid transit operations with 5- to 10-minute headways. Therefore, the APTA criteria are questionable for assessing the noise impact of other transit modes which differ from conventional rapid transit with respect to source emission levels and operating characteristics (e.g., commuter rail, AGT and a variety of bus projects).

4. "Synthesis of Social Surveys on Noise Annoyance":<sup>(4)</sup> In 1978, Theodore J. Schultz, an internationally known acoustical scientist, synthesized the results of a large number of social surveys, each concerning annoyance due to transportation noise. Remarkable consistency was found in a group of these surveys, and the author proposed that their average results be taken as the best available prediction of transportation noise annoyance. This synthesis has received essentially unanimous acceptance by acoustical scientists and engineers. The "universal" transportation response curve developed by Schultz (Figure 2-7) shows that the percent of the population highly annoyed by transportation noise increases from zero at an  $L_{dn}$  of approximately 50 dBA to 100-percent when  $L_{dn}$  is about 90 dBA. Most significantly, this curve indicates that for the same increase in  $L_{dn}$ , there is a greater increase in the number of people highly annoyed at high noise levels than at low noise levels. In other words, a 5 dB increase at low ambient levels (40 - 50 dB) has less impact than at higher ambient levels (65 - 75 dB). A recent update of the original research, containing several railroad, transit and street traffic noise surveys, confirmed the shape of the original Schultz curve.<sup>(5)</sup>
5. HUD Standards:<sup>(6)</sup> The U.S. Department of Housing and Urban Development has developed noise standards, criteria and guidelines to ensure that housing projects supported by HUD achieve the goal of a suitable living environment. The HUD site acceptability standards define 65 dB ( $L_{dn}$ ) as the threshold for a normally unacceptable living environment and 75 dB ( $L_{dn}$ ) as the threshold for an unacceptable living environment.

## **B.2 BASIS FOR NOISE IMPACT CRITERIA CURVES**

The lower curve in Figure 3-1 representing the onset of Moderate Impact is based on the following considerations:

- The EPA finding that a community noise level of  $L_{dn}$  less than or equal to 55 dBA is "requisite to protect public health and welfare with an adequate margin of safety."<sup>(1)</sup>
- The conclusion by EPA and others that a 5 dB increase in  $L_{dn}$  or  $L_{eq}$  is the minimum required for a change in community reaction.
- The research finding that there are very few people highly annoyed when the  $L_{dn}$  is 50 dBA, and that an increase in  $L_{dn}$  from 50 dBA to 55 dBA results in an average of 2% more people highly annoyed (see Figure 2-10 in Chapter 2).